What is claimed is:

1. A torque sensor, comprising:

a magnetic metal film with magnetic anisotropy attached to a torque transmission shaft;

an exciting coil and a detector coil each installed near the magnetic metal film;

an excitation power supply source that generates an ac excitation signal to be supplied to the exciting coil;

a reference voltage generator that is connected to the excitation power supply source to input the excitation signal and send the ac excitation signal whose reference voltage indicating a midpoint of the ac excitation signal is set to a voltage corresponding to a 50 % duty ratio of the ac excitation signal, to the exciting coil;

and

a torque detector that is connected to the detector coil and detects a torque applied to the torque transmission shaft based on an output of the detector coil when the torque is applied.

2. A torque sensor according to claim 1, wherein the reference voltage is supplied to the torque detector such that the torque detector detects the applied toque based on phase of the output of the detector coil when the output of the detector coil coincides with the reference voltage.

3. A torque sensor according to claim 1, wherein the torque sensor is installed in an electric power steering system powered by an electric motor and provided in a vehicle such that torque applied through a steering wheel is detected.

4. A torque sensor according to claim 1, wherein the excitation power supply source includes a frequency divider whose frequency division ratio is set to be variable.

5. A torque sensor according to claim 4, further including:

a second detector coil installed with the detector coil near the magnetic metal film in such a manner that they are wound in opposite directions.

6. A torque sensor according to claim 5, wherein coil elements of the exciting coil are in series connection with negative voltage side connected with positive voltage side, and coil elements of the detector coil are in differential connection with their negative voltage sides connected to each other, whilst coil elements of the second coil detector are in differential connection with their positive voltage sides connected to each other.

7. A torque sensor according to claim 1, wherein the output of the detector coil is added by a bias voltage.

8. A torque sensor according to claim 7, wherein the bias voltage is different from the excitation signal by 90 degrees in phase.

9. A torque sensor, comprising:

a magnetic metal film with magnetic anisotropy attached to a torque

transmission shaft;

an exciting coil and a detector coil each installed near the magnetic metal film;

an excitation power supply source that supplies a power for an excitation signal to be supplied to the exciting coil;

a microcomputer that constitutes the torque detector; and

an excitation signal generator that is connected to the excitation power supply source to input the power and generates the excitation signal from the power based on clock frequency of the microcomputer.

10. A torque sensor according to claim 9, wherein the excitation signal generator generates a sine wave of predetermined frequency through an analog circuit from a square wave obtained by dividing the clock frequency, and generates the excitation signal from the sine wave.

11. A torque sensor according to claim 9, further including:

a second detector coil installed with the detector coil near the magnetic metal film; and

a failure detector that is connected to the detector coil and the second detector coil, and detects a failure of the torque based on outputs of the detector coil and the second detector coil.

12. A torque sensor according to claim 9, wherein the torque sensor is installed in an electric power steering system powered by an electric motor and provided in a vehicle such that torque applied through a steering wheel is detected.

13. A torque sensor according to claim 9, further including:

a second detector coil installed with the detector coil near the magnetic metal film in such a manner that they are wound in opposite directions.

14. A torque sensor according to claim 9, wherein coil elements of the exciting coil are in series connection with negative voltage side connected with positive voltage side, and coil elements of the detector coil are in differential connection with their negative voltage sides connected to each other, whilst coil elements of the second coil detector are in differential connection with their positive voltage sides connected to each other.

15. A torque sensor according to claim 9, wherein the output of the detector coil is added by a bias voltage.

16. A torque sensor according to claim 15, wherein the bias voltage is different from the excitation signal by 90 degrees in phase.